

# **FROM BONE TO STONE**

**Karen Haydock**

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**This is the big  
Triceratops  
That was killed in a fight  
One Saturday night.**

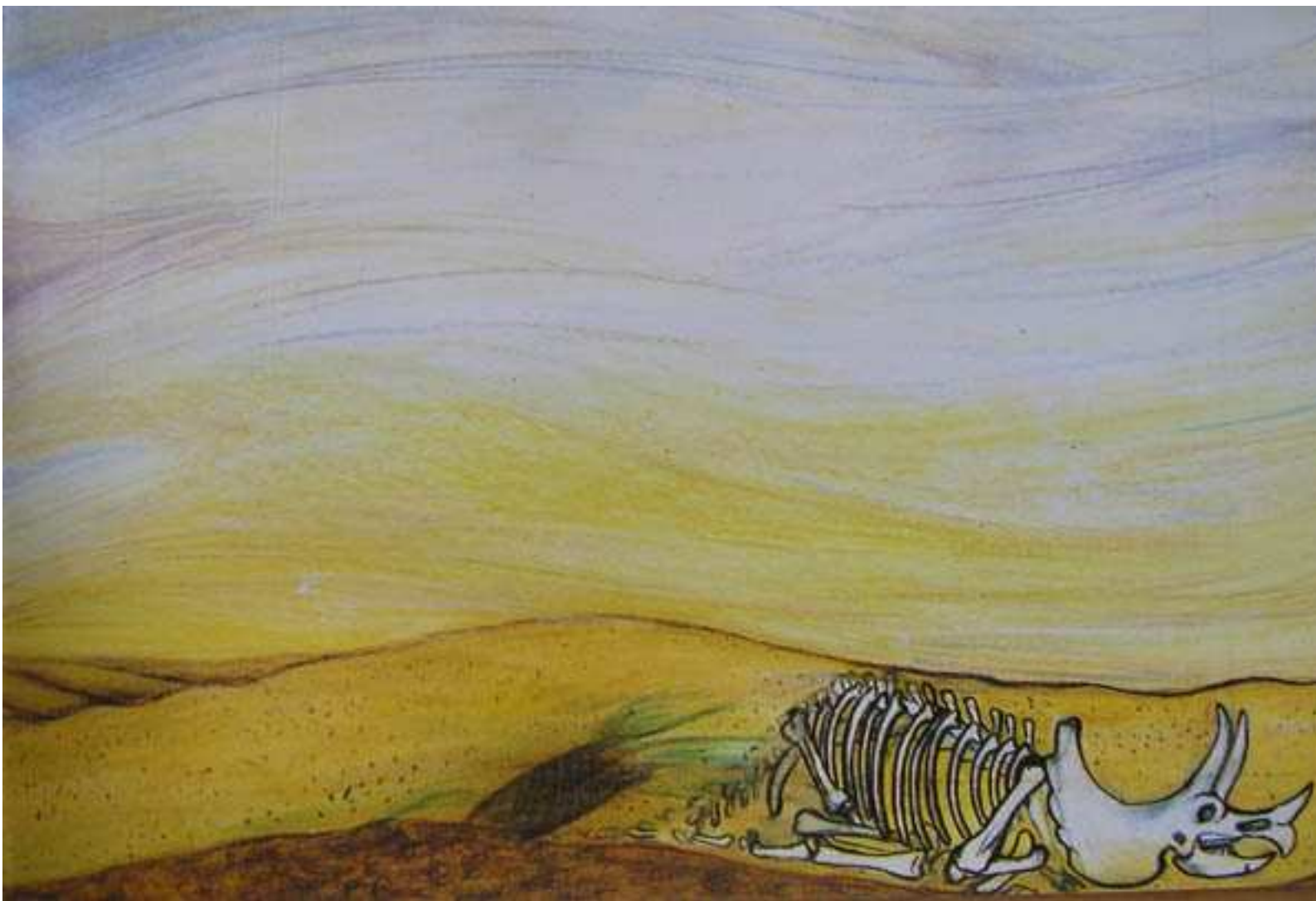
**(67 million years ago)**





**These are the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

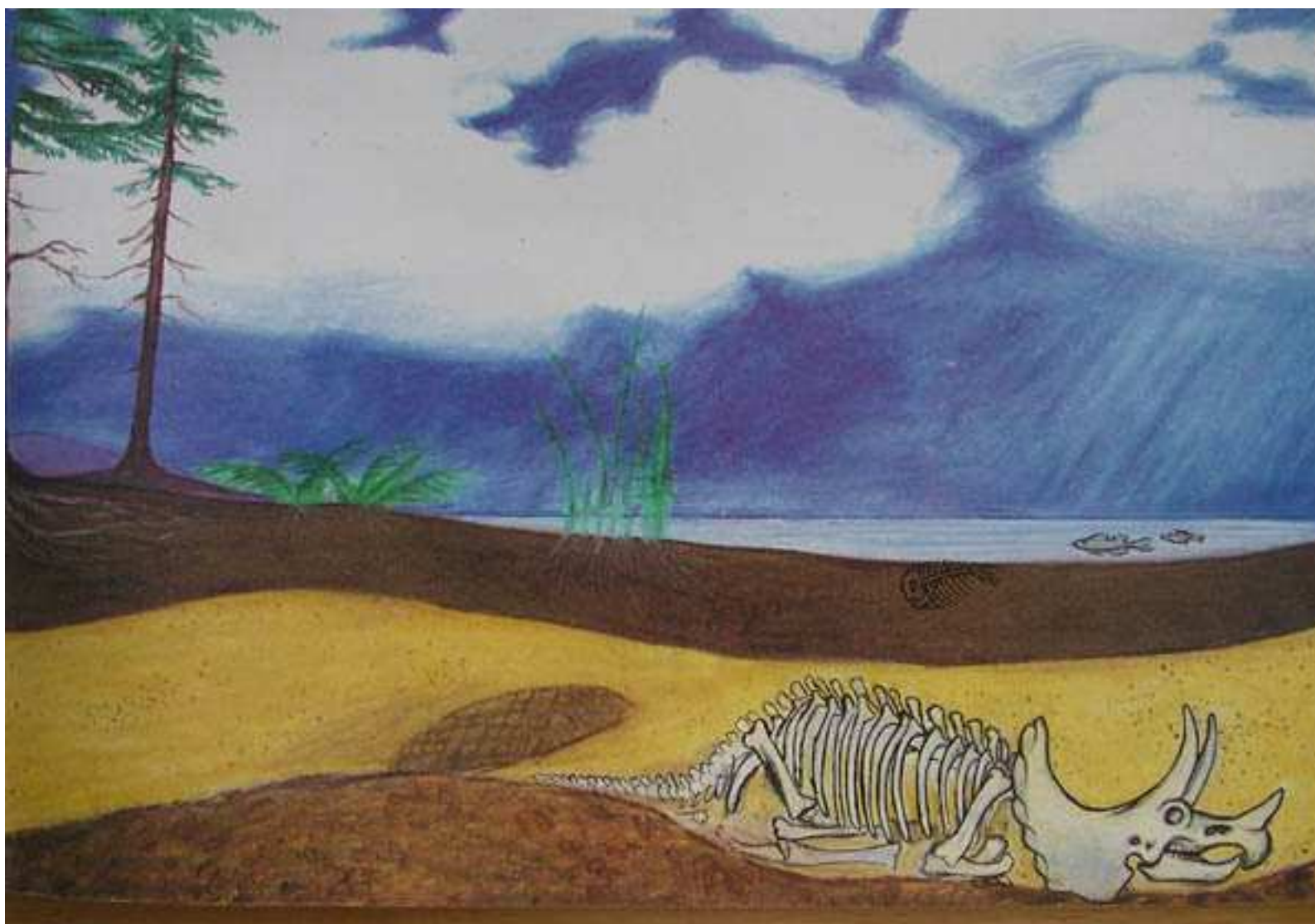
**(67 million years ago)**



**This is the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

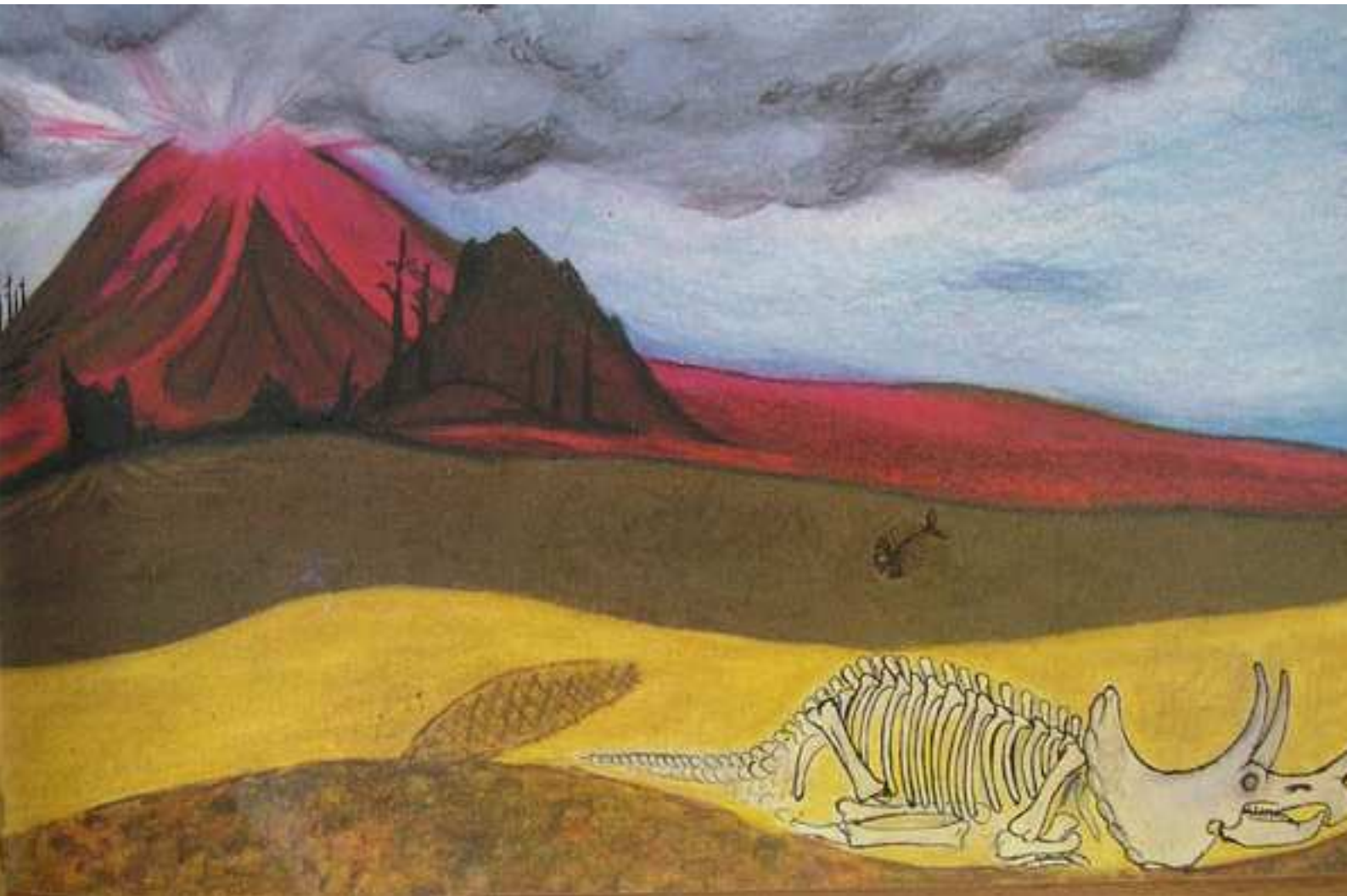
**(67 million years ago)**





**This is the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

**(65 million years ago)**



**This is the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

**(40 million years ago)**





**This is the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

**(20 million years ago)**



**This is the land  
That pushed the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

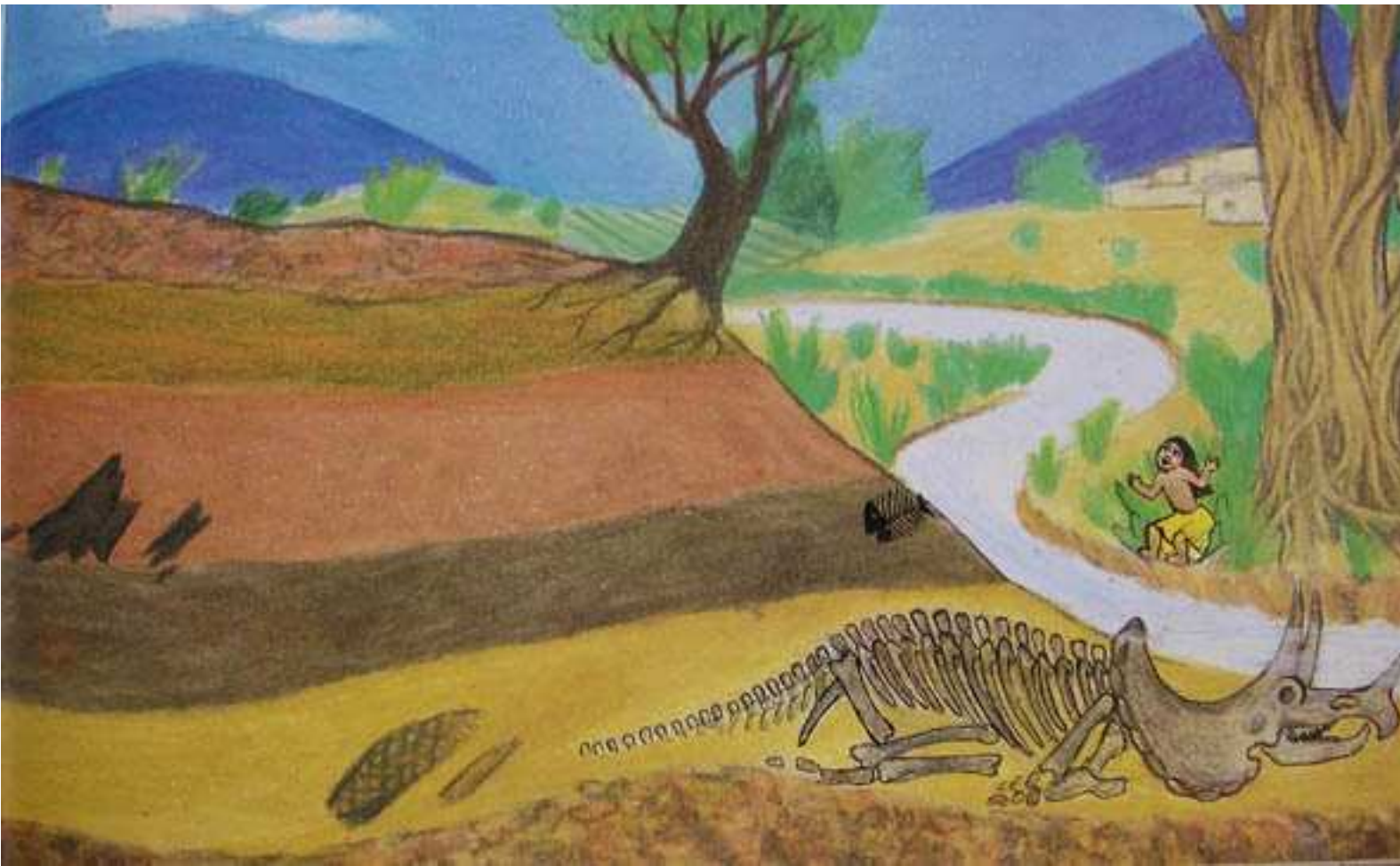
**(10 million years ago)**





**This is the river  
That wore down the land  
That pushed the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

**(20 years ago)**



**This is the child  
That swam in the river  
That wore down the land  
That pushed the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

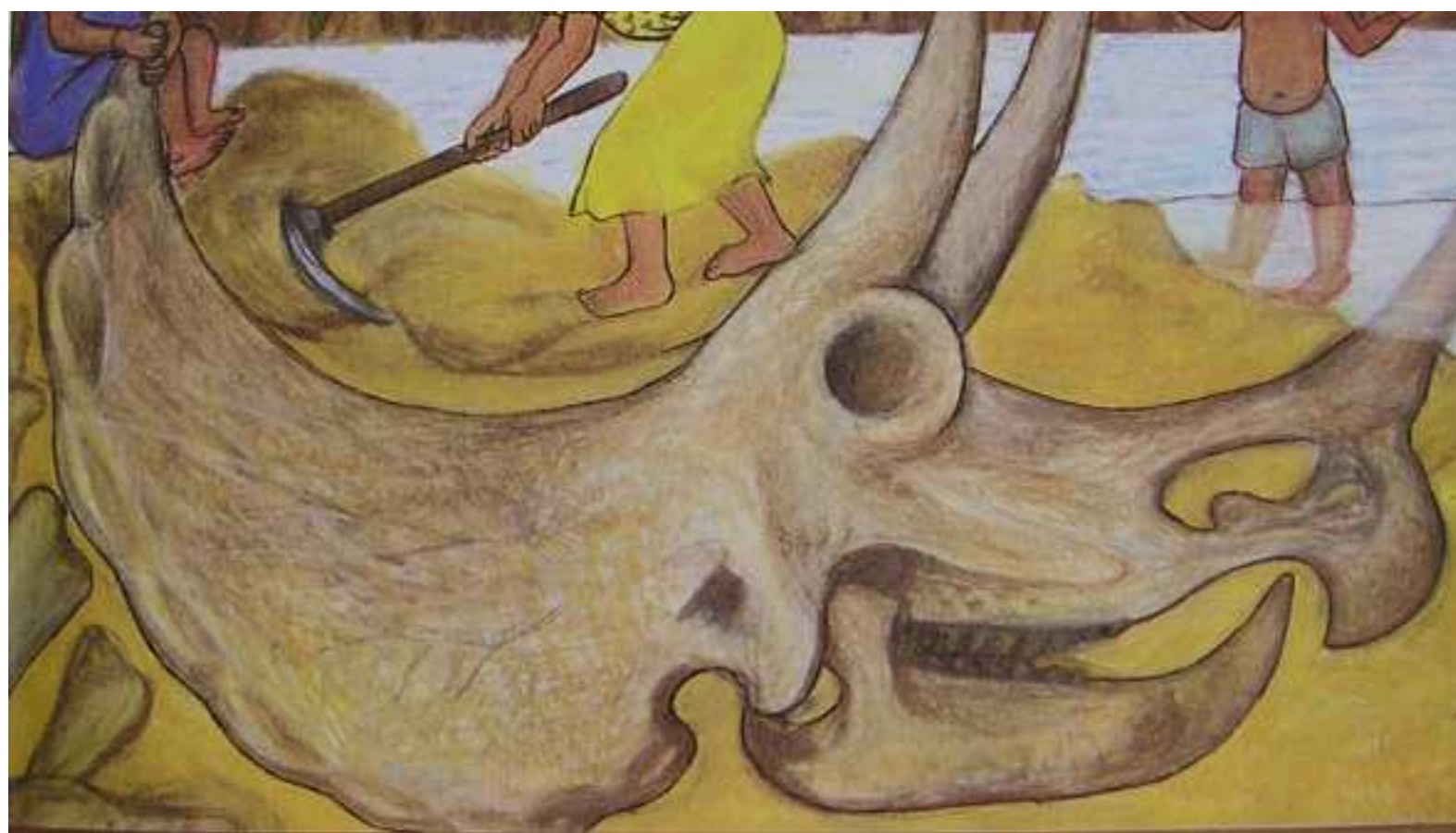
**(10 years ago)**





**This is the bone  
Found by the child  
That swam in the river  
That wore down the land  
That pushed the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

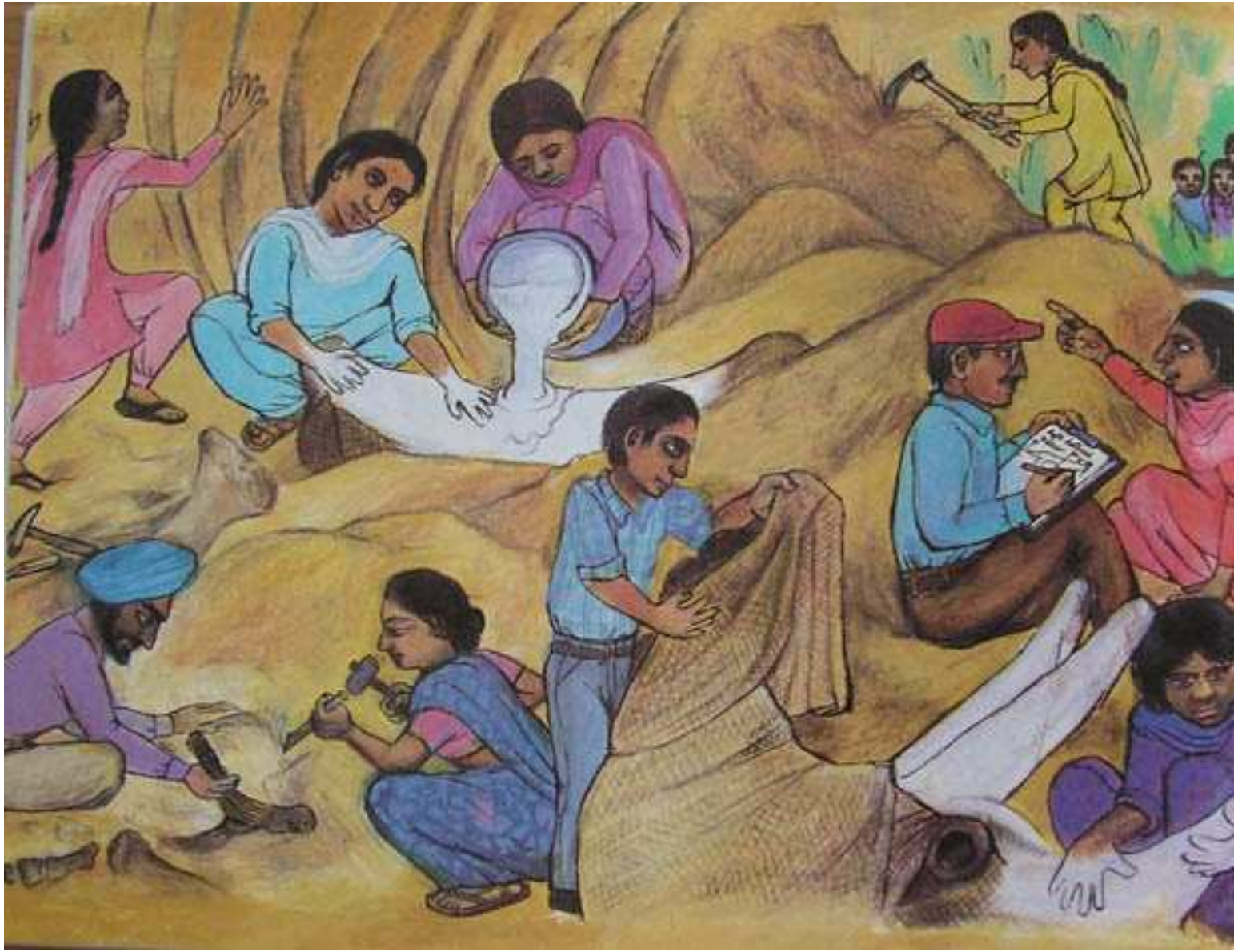
**(10 years ago)**



**This is the bone  
That had become stone  
Found by the child  
That swam in the river  
That wore down the land  
That pushed the dirt  
That buried the lava  
That covered the mud  
That hid the sand  
That blew over the bones  
Of the big Triceratops  
That was killed in a fight  
One Saturday night.**

**(10 years ago)**





**(THE END)**

### HERE'S A FEW QUESTIONS TO THINK ABOUT:

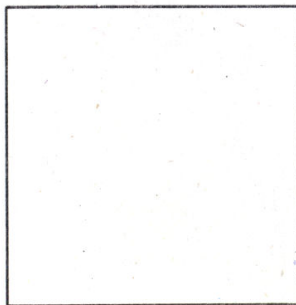
1. How many layers did the river have to wash away before it reached the layer containing the Triceratops fossils?
2. Why do think the Triceratops had that big 'collar' sticking out behind its head? Think of five different possible reasons.
3. Do you think the Tyrannosaurus walked on four legs or two? Why?
4. Who do you think could run faster, the Triceratops or the Tyrannosaurus?
5. Once some people had to cut the side of a mountain away to build a road. They saw that the mountain was made of layers of different coloured dirt and rock. They also found some fossils in the layers. On the top there was a yellowish brown layer that had some fossils of leaves. Then there was a dark brown layer with some fossils of fish. At the bottom was a reddish brown layer that contained some fossils of birds.

Do you think the birds that made those fossils had lived before the fish, or did the fish live before the birds? Why?

How come fish fossils were found on the top of a mountain?



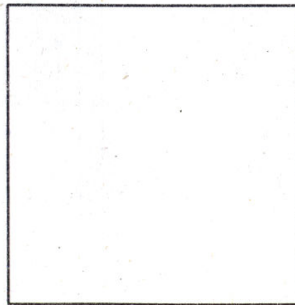
6. Find the following in the story and tell which came first and which came later:



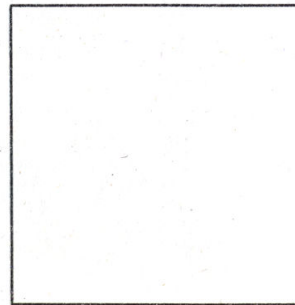
A pine tree



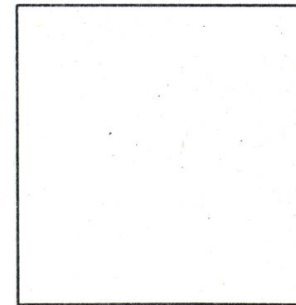
A rabbit



A pterosaur



A cycad tree



An owl

Ask all your friends to help you think of different possible answers for all these questions, and then have a discussion and a vote to see which answers you think are best.



## THINGS TO DO

Here are a few activities to try. Most of them can be done by 8 year old children without any help from adults, beyond helping to supply the needed materials.

### MAKE YOUR OWN 'FOSSIL'

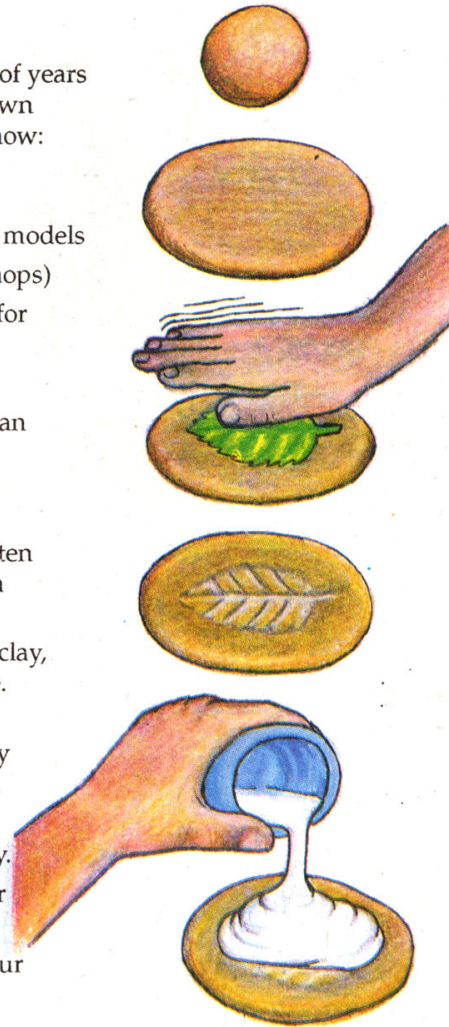
A real fossil takes many thousands of years to make – but you can make your own pretend 'fossil' in one day. Here's how:

#### Materials you will need:

- leaves, bones, or plastic dinosaur models
- plasticine clay (available in toy shops)
- plaster of paris (commonly used for fixing holes in walls)
- water
- container for mixing plaster (e.g. an empty ice cream cup and spoon)

#### Method:

1. Take a 3-4 cm ball of clay and flatten it out into a smooth, flat disk on a piece of newspaper.
2. Make a dinosaur footprint in the clay, or an impression of a leaf or bone.
3. Add 2 tablespoons of water to 4 tablespoons of plaster and quickly mix until you get a smooth paste.
4. Quickly dump the entire mixture on the clay, covering it completely.
5. Let the plaster harden and dry for at least 2 hours.
6. Remove the clay - and there is your plaster 'fossil'.



### MAKE YOUR OWN MODEL

You can make a model showing how things get covered by different layers of earth, just like in the story. Here's how:

#### Materials you will need:

- small leaves, bones, or a plastic dinosaur model
- a tall empty glass jar with a cover (clean, without label)
- sand and dirt of several different shades [powdered colours, like those used for holi, rangoli, or for painting]

#### Method:

1. Pour a layer of sand or dirt in the bottom of the jar.
2. Put a few leaves or bones or a dinosaur model in the sand. Place them carefully along the side so they can be partially seen.
3. Add another layer of sand or dirt of a contrasting colour. The powdered colours can be used to colour the sand if you can't find enough different natural colours. Mix the colour thoroughly into the sand before adding it to the jar. Keep adding more layers until the jar is full. Different kinds of bones or whatever can be placed in different layers.
4. Tightly cover the jar, and display it to all your friends.





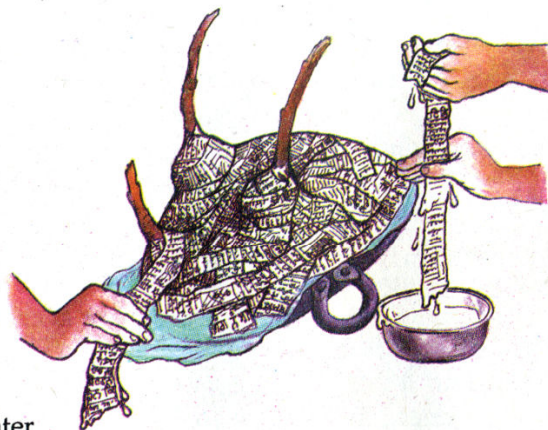
## MAKING PAPIER MÂCHÉ DINOSAUR MASKS

### Materials you will need:

- a very big kadahi
- old newspapers
- a large plastic bag, cut open to cover the kadahi
- maida (1 to 2 cups)
- a few branches of trees for horns
- paints and brushes

### Method:

1. Turn the kadahi upside down and cover it with the plastic bag.
2. Mix  $\frac{1}{2}$  cup of maida with enough water (about  $\frac{3}{4}$  cup) to get a smooth thin paste.
3. Tear the newspapers into long strips about 3 to 5 cm wide.
4. Take one strip at a time, dip it in the maida paste until both sides are thinly coated (wipe off the excess by pulling the paper between your fingers), and drape it across the kadahi. Smooth the surface with your hands. Keep adding strips overlapping across each other at all angles, until the kadahi is completely covered with several layers. Let it dry completely in the sun.
5. Now you have to attach the 'horns', if you want to make a Triceratops. Crumple up a wad of newspaper around the base of each 'horn'. Place them at the right places on the mask and paste more newspaper strips all over and around them until all three horns are secured in place. The bumps below the upper horns are for the dinosaur's eyes. Let the mask dry in the sun again.
6. Remove the mask from the kadahi. Be sure it's dry. Get an adult to help you cut out two small holes to see through when you wear the mask (the holes should be closer together than the dinosaur's eyes).
7. Now you can have fun painting your mask. Don't let anybody tell you how to do it—nobody knows any better than you do what colours to make a dinosaur—nobody has ever seen one!
8. Attach a string at each side to hold the mask on your head.
9. Put on your mask and see how scared everyone will be!



### MORE FUN:

You can stage a short play based on this book. First decide who will play each character: Someone can be the Tyrannosaurus, and someone else can be the Triceratops. They can even wear dinosaur masks. In the beginning they will have to have a big fight. Decide what they should say to each other as they are fighting. In the end, the Triceratops will fall.

Then comes the hard part. The Tyrannosaurus has to eat the meat off the Triceratops' bones. Maybe some Pterosaurs can fly in and help.

Then someone comes running over with a large bed sheet to cover the bones of the Triceratops, while saying, 'This is the sand that blew over the bones of the big Triceratops that was killed in a fight one Saturday night.'

After that comes the lava, the dirt, and the land, until many layers of bed sheets cover the Triceratops, and each 'layer' has recited its lines.

Now, think. How will you show the river wearing away the layers?

Finally the child will come along, swimming in the river. Maybe she could do a swimming dance. Suddenly she bumps into what she thinks is a stone – but it's really a bone that has turned into stone. After the bone finishes reciting its lines, everyone can take a deep breath—that's the end!



## MORE ABOUT THE TRICERATOPS

HOW DO YOU SAY IT? Triceratops: 'TRY-SER-AH-TOPS' (or 'TRY-KER-AH-TOPS') Tyrannosaurus: 'TIE-RAN-OH-SOAR-US'

**There are no dinosaurs living today.** The last dinosaurs became extinct about 65 million years ago. The Triceratops lived 65 to 67 million years ago. All our knowledge about them is based on fossils. That's all that is left.

**When you find a bone fossil, how to know it's a dinosaur bone, and how do you know which part of the body it came from?**

Sometimes a complete, or nearly complete set of bones from one dinosaur is found. Sometimes the bones are even found positioned almost as they were in life. But usually the bones have gotten mixed up and spread around, and the entire skeleton is not fossilised, or not found.

Scientists study the bones of animals that are living today. When dinosaur bones are compared to the bones of similar living animals, we can get some clues about how dinosaurs looked and acted. What living animal looks most like a Triceratops?

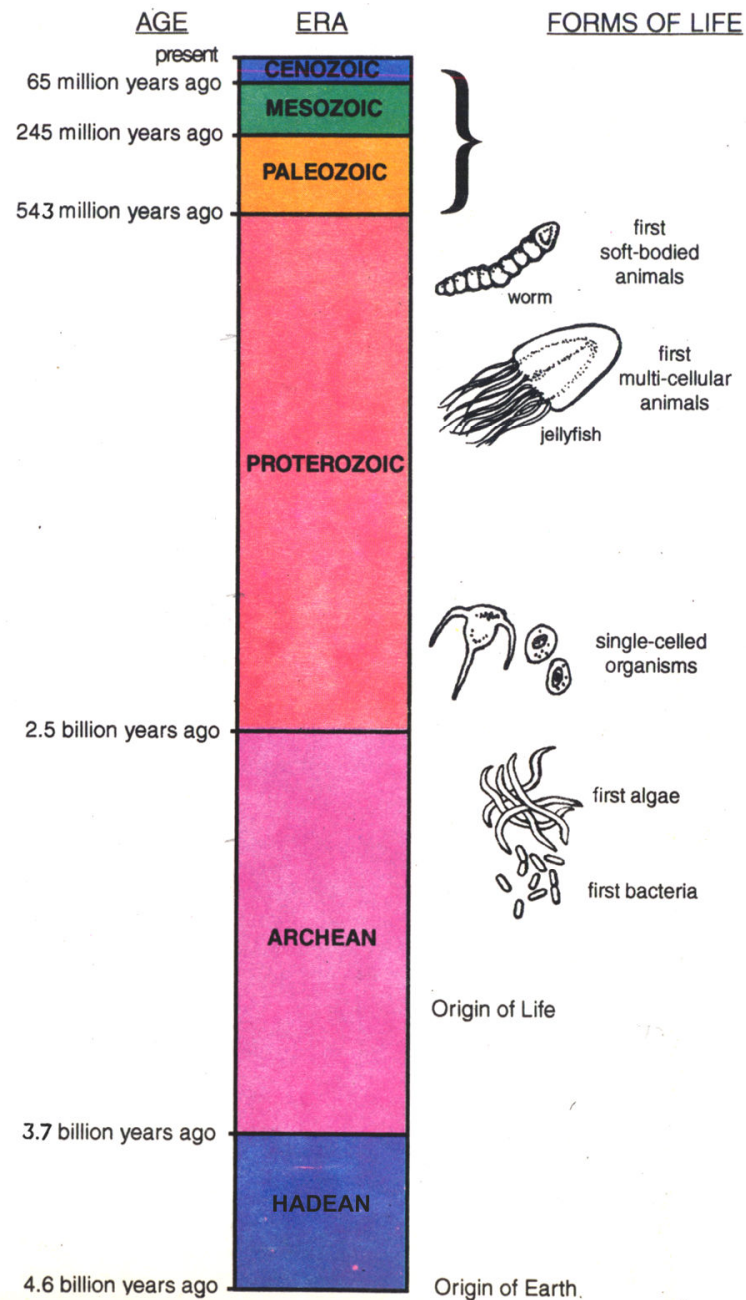
- Some Triceratops were more than twice as big as the biggest Indian rhinoceros. The largest Triceratops skeletons are about 9 meters long and 3.5 meters high. The skull could be up to 3 metres long (that's three times the height of a five year old child !). That's a big head!
- Triceratops had the kind of teeth that are good for grinding. This is the kind of teeth plant-eaters have. So scientists think Triceratops were herbivores.
- Was their eyesight as bad as a rhino's eyesight? Although

there are no large rhino-eaters that rhinos have to watch out for, there were a number of large meat-eating dinosaurs living at the same time as the Triceratops. So they probably had better eyesight than rhino's do. They needed it!

- Good eyesight would also have allowed them to admire each other's horns and fancy 'frills' on their heads. And if they liked to look at each other, maybe this means they were also less solitary than rhinos - maybe they preferred to live together in groups.
- Rhino's are colour - blind. But dinosaurs are actually more closely related to reptiles and birds, which are very colourful animals, who can see all colours and are attracted by each other's bright colours. So it's likely that Triceratops were also colourful and not colour - blind.
- Although their heads were big, Triceratops' brains were fairly small. By studying the sizes and shapes of the part of the skull that was filled by the brain, scientists try to find out something about their abilities and behaviour. For example they find that the part of the brain that controls the ability to smell was fairly large and well developed. So probably were good smellers.

Actually no one has yet found any Triceratops fossils in India (Other types of dinosaurs have been found, though). So far, Triceratops have only been found in western North America. But maybe not enough people in India have been looking for them. May be you will be the first one to find a Triceratops!

# THE TIME LINE OF LIFE ON EARTH



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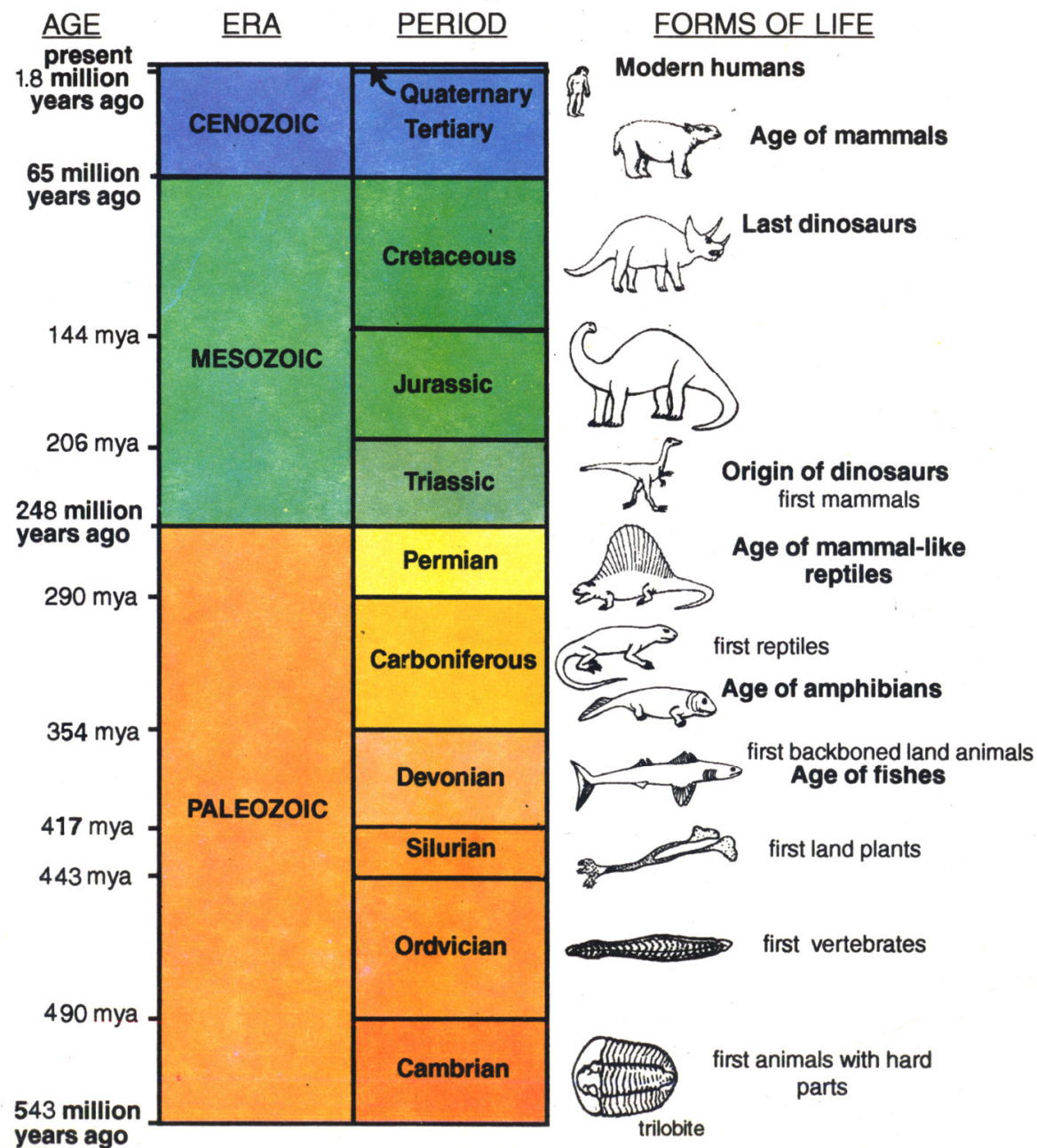
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